

Patent Claims

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1. Medium for producing and/or treating alcohol-containing beverages, especially wine or sparkling wine,

consisting of microcapsules, that each show at least one membrane cartridge that completely encloses the inner capsule, whereby the inner capsule cells include at least one species of microorganisms and/or one or more enzymes, and

whereby the membrane cartridge is not permeable to the cells or enzymes enclosed in the inner capsule, and

whereby the membrane cartridge is permeable to the output product to be converted by the cells or enzymes and to at least one part of the products converted by the cells or enzymes.

Characterized in that

the membrane cartridge has two layers radially arranged above one another, whereby each layer completely encloses all of the layers radially arranged below it.
 2. Medium according to claim 1, characterized in that at least two layers of the membrane cartridge consist of different substances.
 3. Medium according to claim 1 or 2, characterized in that the cells or enzymes contained in the inner microcapsule are embedded in a matrix.
 4. Medium according to claim 3, characterized in that the matrix shows an alginate bond of a polyvalent cation.

5. Medium according to Claim 3 ~~or 4~~, characterized in that at least one layer of the membrane cartridge consists of one of the different substances that embed the cells or enzymes and that constitute the matrix.
6. Medium according to Claim 5, characterized in that the matrix in the inner part of the microcapsule is liquefied.
7. Medium according to one of the previous claims¹⁻², characterized in that the layers are bonded covalently and/or ionically with each other.
8. Medium according to one of the previous claims¹⁻², characterized in that the membrane cartridge is not permeable to the active substances and/or microorganisms found outside the microcapsule, which impair the activity of the cells or enzymes contained in the inner capsule.
9. Medium according to one of the previous claims¹⁻², characterized in that the inner part of the microcapsule contains cells of at least one species of yeast used in alcohol fermentation, preferably in wine production.
10. Medium according to one of the previous claims¹⁻², characterized in that the inner part of the microcapsule contains cells of at least one species of lactic acid bacteria used in the biological acid breakdown process in wine treatment.
11. Medium according to one of the previous claims¹⁻², characterized in that the inner part of the microcapsule contains one or more enzymes from the group of pectases, glycosides, β -glucosidases, proteases, and/or glucose-fructose-isomerases.
12. Medium according to one of the previous claims¹⁻², characterized in that the inner part of the microcapsule contains cells from at least one species of microorganisms and at least one enzyme.

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13. Medium according to claim 12, characterized in that the inner part of the microcapsule contains at least one species of yeast used in wine production as well as at least one yeast cell wall preparation and/or a glucose-fructose-isomerase.

e 14. Medium according to one of the previous claims¹⁻², characterized in that the inner part of the microcapsule contains, apart from the cells or enzymes, at least one substance that increases the activity of the cells or enzymes.

g 15. Medium according to one of the previous claims¹⁻², characterized in at least one layer of the membrane cartridge is constructed of at least one polymer.

16. Medium according to claim 15, characterized in that that polymer is a polyelectrolyte complex.

17. Medium according to claim 16, characterized in that the polyelectrolyte complex has a polyanion from the group of ^{selected from} polyacrylic acid, polymethacrylic acid, polyvinylsulfonic acid, polyvinylphosphonic acid, alginate acid, cellulose derivatives, especially carboxymethyl cellulose or cellulose-sulfuric acid ester, shellac or shellac components such as aleuritin acid or shellol acid and at least one polycation from the group of polyethylenimine, polydimethyl dialylammonium, chitosan, or poly-L-lysine.

a 18. Medium according to claim 16 ~~or 17~~, characterized in that the polyanion or the polycation has a mid-range polymerization level of from 100 to 15,000, whereby the polycation or polyanion as counter-ion has a mid-range polymerization level of over 50,000.

19. Medium according to claim 15, characterized in that the polymer polystyrol, polymethyl acrylate and/or natural rubber or a mixture thereof is with one or more polyelectrolytic complexes.

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20. Application of a medium according to claims 1 through ~~19~~² for the production of beer, characterized in that the microcapsules contain cells of one or more of the yeast species used in beer production.
21. Application of a medium according to claims 1 through ~~19~~² for the production of low-molecular alcohol, preferably from ethanol, characterized in that the microcapsules contain cells of one or more of the yeast species that enable high yields of alcohol production.

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